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10/767,012	01/29/2004	Jay A. Morrison	2003P17581US	4734

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EXAMINER	
WOLLSCHLAGER, JEFFREY MICHAEL	
ART UNIT	PAPER NUMBER
1732	

DATE MAILED: 09/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/767,012	MORRISON ET AL.	
	Examiner	Art Unit	
	Jeff Wollschlager	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

The amendment to the claims filed July 21, 2006 has been entered. Claim 1 is currently amended. Claim 4 is cancelled. Claims 1-3 and 5-18 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 5-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Cornie et al (WO 01/21344; published March 29, 2001).

Regarding claim 1, Cornie et al. teach a method of manufacturing comprising: defining a cavity between an inner mold comprising a fugitive material portion and an outer mold (page 8, line 19-page 9, line 31; page 10, line 28-page 11, line 21); casting a layer of ceramic insulating material (e.g. refractory slurry) within the cavity; removing the outer mold (page 3, line 28-page 4, line 5; page 7, line 11-17; page 11, line 30 – page 12, line 4; page 12, line 8-11; page 16, line 19-20; page 16, line 30-31; page 20, line 15-22; page 21, line 10-page 22, line 2); performing a mechanical process on the layer of ceramic insulating material while the inner mold remains in place for mechanically supporting the layer of ceramic insulating material and removing the fugitive material and removing the inner mold; wherein the step of performing a mechanical process

comprises machining the layer of ceramic material to a predetermined thickness (page 4, line 19-24; page 6, line 16-25; page 25, line 20-28).

As to claim 5, the cavity employed by Cornie et al. facilitates the step of casting and the step of machining the material into the final shape as taught by Li et al., clearly suggests reducing a thickness dimension of the layer of ceramic insulating material to less than the thickness dimension of the cavity (page 6, line 16-25; page 25, line 20-28).

As to claim 6, Cornie et al. teach the inner mold defines a desired net shape (page 6, line 16-25).

As to claim 7, the method taught by Cornie et al. for forming a product with an internal structure intrinsically at least partially cures the layer of ceramic insulating material prior to removing the inner mold.

Regarding claim 8, Cornie et al. teach a method of manufacturing comprising: defining a cavity between an inner mold comprising a fugitive material portion and an outer mold (page 8, line 19-page 9, line 31; page 10, line 28-page 11, line 21); casting a layer of ceramic insulating material (e.g. refractory cement slurry) within the cavity; removing the outer mold (page 3, line 28-page 4, line 5; page 7, line 11-17; page 11, line 30 – page 12, line 4; page 12, line 8-11; page 16, line 19-20; page 16, line 30-31; page 20, line 15-22; page 21, line 10-page 22, line 2); performing a mechanical process on the layer of ceramic insulating material while the inner mold remains in place for mechanically supporting the layer of ceramic insulating material and removing the fugitive material and removing the inner mold (page 4, line 19-24; page 6, line 16-25; page 25, line 20-28); at least partially curing the layer of ceramic insulating material

after the inner mold has been removed and installing a second inner mold comprising a fugitive material portion for supporting the ceramic insulating material during a subsequent processing step (page 10, line 28 – page 11 line 21; page 11, line 30 - page 12, line 11; page 12, line 17-32; page 20, line 15-22; page 21, line 10 - page 22, line 2).

As to claim 9, Cornie et al. teach the first and second inner mold comprise different materials (page 10, line 28 – page 11 line 21).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (U.S. Patent 6,350,404; issued February 26, 2002).

Regarding claim 1, Li et al. teach a method for producing a ceramic part with an internal structure, such as a gas turbine blade, comprising the steps: defining a cavity between an inner mold comprising a polystyrene foam insert/fugitive material portion and an outer mold (col. 1, line 67 – col. 2, line 1; col. 2, line 40), casting a layer of ceramic insulating material within the cavity (col. 2, lines 1-3 and lines 27-30), removing the outer mold (col. 2, lines 50-51); performing a mechanical machining process to shape the material into the final shape (col. 3, lines 16-19); and removing the polystyrene foam insert/fugitive material, thus removing the inner mold (col. 2, lines 4 and 52-54). Li et al. do not expressly state the step of performing the mechanical process occurs while the inner mold remains in place.

However, it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to perform the mechanical machining step disclosed by Li et al., while the inner mold remains in place in order to quickly repair any damage to the surface of the material that may have occurred by removing the outer mold before it is able to get worse; to maximize productivity, for example, by beginning the machining process while the inner mold is in place and starting to dissolve; or for the purpose of fostering a better flow of work in the manufacturing area by keeping the processing equipment in one location and the flammable and toxic organic materials used for dissolving the insert in another, differently classified area.

Further, it has been held that switching the sequence of performing process steps is *prima facie* obvious to the ordinarily skilled artisan absent the showing of new or unexpected results.

As to claim 5, the cavity employed by Li et al. facilitates the step of casting and the step of machining the material into the final shape (col. 3, lines 16-18), as taught by Li et al., clearly suggests reducing a thickness dimension of the layer of ceramic insulating material to less than the thickness dimension of the cavity.

As to claim 6, Li et al. teach the inner mold defines a desired net shape (col. 3, lines 14-16).

As to claim 7, the method taught by Li et al. for forming a product with an internal structure intrinsically at least partially cures the layer of ceramic insulating material prior to removing the inner mold.

Claims 2, 3, 11-13, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. as applied to claims 1, 5, 6, and 7 above, in view of Owen et al. (U.S. Patent 5,881,775; issued March 16, 1999).

As to claim 2, Li et al. teach the method of claim 1 as discussed in the 103(a) rejection above, but do not teach applying a layer of ceramic matrix composite material to the layer of ceramic insulating material prior to the step of removing the fugitive material and the inner mold. However Owen et al. teach a method of applying a fiber ceramic composite/ ceramic matrix composite to a layer of ceramic insulating material (Figure 1, elements (4) and (6)).

Therefore, it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to modify the method taught by Li et al. of forming a ceramic structure with the method taught by Owen et al. of forming a ceramic

structure with an fiber ceramic composite/ceramic matrix composite for the purpose of creating a stronger and safer product, as described by Owen et al. (col. 1, lines 62-67; col. 2, lines 21-23).

As to claim 3, Li et al. further teach performing a mechanical process on an inside surface of the layer of ceramic insulating material after removing the inner mold (col. 3, lines 14-16).

Regarding claims 11 and 12, Li et al. teach a method for producing a ceramic part with an internal structure, such as a gas turbine blade, comprising the steps: defining an annular cavity between an inner mold comprising a polystyrene foam insert/fugitive material portion and an outer mold (col. 1, line 67 – col. 2, line 1; col. 2, line 40), casting a layer of ceramic insulating material within the cavity (col. 2, lines 1-3 and lines 27-30), removing the outer mold (col. 2, lines 50-51); performing a mechanical machining process to shape the material into the final shape (col. 3, lines 16-19); and removing/dissolving/transforming the polystyrene foam insert/fugitive material, thus removing the inner mold (col. 2, lines 4 and 52-54). Li et al. do not expressly state the step of performing the mechanical process occurs while the inner mold remains in place.

However, it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to perform the mechanical machining step disclosed by Li et al., while the inner mold remains in place in order to quickly repair any damage to the surface of the material that may have occurred by removing the outer mold before it is able to get worse; to maximize productivity, for example, by beginning

the machining process while the inner mold is in place and starting to dissolve; or for the purpose of fostering a better flow of work in the manufacturing area by keeping the processing equipment in one location and the flammable and toxic organic materials used for dissolving the insert in another, differently classified area.

Further, it has been held that switching the sequence of performing process steps is *prima facie* obvious to the ordinarily skilled artisan absent the showing of new or unexpected results.

Additionally, Li et al. do not teach forming a layer of ceramic matrix composite material on an outer surface of the ceramic insulating material. However, Owen et al. teach a method of applying a fiber ceramic composite/ ceramic matrix composite to a layer of ceramic insulating material (Figure 1, elements (4) and (6)).

Therefore, it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to modify the method taught by Li et al. of forming a ceramic structure with the method taught by Owen et al. of forming a ceramic structure with an fiber ceramic composite/ceramic matrix composite for the purpose of creating a stronger and safer product, as described by Owen et al. (col. 1, lines 62-67; col. 2, lines 21-23).

As to claim 13, the method taught by Li et al. for forming a product with an internal structure intrinsically at least partially cures the layer of ceramic insulating material prior to removing the inner mold.

As to claims 16 and 17, Li et al. disclose performing a mechanical process on a body that does or does not have a net-shape (col. 3, lines 14-18).

As to claim 18, neither Li et al. nor Owens teach the specifically claimed dimensions. However, the thickness dimensions would have been readily optimized in view of the required operating temperatures and pressure of the final article and the curing rate of the particular insulating material being machined in order to prevent cracking, as is routinely practiced in the art.

Claims 2, 3, 10 and 11-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornie et al (WO 01/21344; published March 29, 2001) as applied to claims 1, 5, 6, 7, 8 and 9 above, in view of Ress Jr. (U.S. Patent 5,378,110; issued January 3, 1995) or Kobashi et al. (U.S. Patent 6,830,724; priority date August 15, 2002).

As to claims 2, 3 and 10, Cornie et al. teach the methods of claims 1 and 8, as discussed in the 102(b) rejections above. Cornie et al. further teach applying a layer of metal matrix composite to the layer of ceramic insulating material prior to the step of removing the fugitive material and removing the inner mold (Abstract; previous citations). Cornie et al. do not teach applying a layer of ceramic matrix composite to the layer of ceramic insulating material. However, Ress Jr. teaches an analogous method wherein he demonstrates the known equivalence/interchangeability of ceramic matrix composites and metal matrix composites (col. 1, line67- col. 2, line 2; col. 2, line 34-37) and Kobashi et al. teach an analogous method demonstrating the preference of ceramic matrix composites over metal matrix composites in applications requiring excellent heat resistance (col. 1, lines 22-30).

Therefore, it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to substitute a the metal matrix composite taught by Cornie et al. with a ceramic matrix composite as taught individually by each Ress Jr. and Kobashi et al. for the purpose of producing a material with superior heat resistance.

Regarding claim 11, Cornie et al. teach a method of manufacturing comprising: defining an annular cavity having a first thickness between an inner mold and an outer mold (page 8, line 19-page 9, line 31; page 10, line 28-page 11, line 21); casting a layer of ceramic insulating material (e.g. refractory slurry) within the cavity to have a first thickness; removing the outer mold (page 3, line 28-page 4, line 5; page 7, line 11-17; page 11, line 30 – page 12, line 4; page 12, line 8-11; page 16, line 19-20; page 16, line 30-31; page 20, line 15-22; page 21, line 10-page 22, line 2); performing a mechanical process on the layer of ceramic insulating material while the inner mold remains in place for mechanically supporting the layer of ceramic insulating material and removing the fugitive material and removing the inner mold; wherein the step of performing a mechanical process comprises machining the layer of ceramic material to a predetermined thickness (page 4, line 19-24; page 6, line 16-25; page 25, line 20-28). Cornie et al. further teach applying a layer of metal matrix composite to the layer of ceramic insulating material. Cornie et al do not teach forming a layer of ceramic matrix composite material on an outer surface of the ceramic insulating material.

However, Ress Jr. teaches an analogous method wherein he demonstrates the known equivalence/interchangeability of ceramic matrix composites and metal matrix

composites (col. 1, line67- col. 2, line 2; col. 2, line 34-37) and Kobashi et al. teach an analogous method demonstrating the preference of ceramic matrix composites over metal matrix composites in applications requiring excellent heat resistance (col. 1, lines 22-30).

Therefore, it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to substitute a the metal matrix composite taught by Cornie et al. with a ceramic matrix composite as taught individually by each Ress Jr. and Kobashi et al. for the purpose of producing a material with superior heat resistance.

As to claim 12, Cornie et al. teach the inner mold comprises a fugitive material that is transformed prior to the step of removing the first inner mold (page 8, line 19-page 9, line 31; page 10, line 28-page 11, line 21).

As to claim 13, the ceramic insulating layer intrinsically is at least partially cured in the method taught by Cornie et al. while the inner mold remains in place prior to the step of removing a portion of the ceramic insulating material.

As to claim 14, Cornie et al. further teach performing the step of defining an annular cavity using a first inner mold; removing the first inner mold after the step of casting; at least partially curing the ceramic insulating material after the step of removing the first inner mold; and installing a second mold for supporting the ceramic insulating material page 10, line 28 – page 11 line 21; page 11, line 30 - page 12, line 11; page 12, line 17-32; page 20, line 15-22; page 21, line 10 - page 22, line 2).

As to claim 15, Cornie et al. teach the first and second inner mold comprise different materials (page 10, line 28 – page 11 line 21).

As to claim 16, Cornie et al. further teach performing a mechanical process on an inside surface of the ceramic insulating material (page 4, line 19-24; page 6, line 16-25; page 25, line 20-28).

As to claim 17, Cornie et al. further teach forming the inner mold to have a net shape for the desired passageway (page 4, line 19-24; page 6, line 16-25; page 25, line 20-28).

As to claim 18, Cornie et al. do not teach the claimed thickness dimensions. However, the thickness dimensions would have been readily optimized to produce the desired final product, as is routinely practiced in the art.

Response to Arguments

Applicant's arguments, see REMARKS, filed July 21, 2006, with respect to the objection to the Abstract have been fully considered and are persuasive. The objection to the abstract has been withdrawn.

Applicant's arguments disqualifying the Morrison '051 and Morrison '054 references under 35 USC 103(c) have been fully considered and are persuasive. The rejection of claims 1-18 over these references has been withdrawn.

However, after further consideration new grounds of rejection have been made in view of Li et al. reference (previously applied) and Owens reference (previously

applied). Further, new grounds of rejection are made in view of Cornie et al. and Ress Jr. and Kobashi et al.

Conclusion

All claims are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Wollschlager whose telephone number is 571-272-8937. The examiner can normally be reached on Monday - Thursday 7:00 - 4:45, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JW

Jeff Wollschlager
Examiner
Art Unit 1732

September 15, 2006

CHRISTINA JOHNSON
PRIMARY EXAMINER

9/18/06